AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (currently amended) A method of producing images of infrared (IR) radiation of a patient, the method comprising the steps of:

(a) providing an IR imaging camera configured to receive IR radiation from an array of optical elements (optels) in a field-of-view viewable by the IR imaging camera;

(b) acquiring a plurality of frames of IR radiation from a patient positioned in the field-of-view, with each frame acquired during a corresponding frame sample interval, with each frame corresponding to the IR radiation acquired from the array of optels during its frame sample interval;

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(c) determining plural ~~rates of change~~ values as a function of the IR radiation ~~received~~ acquired from the array, with each ~~rate of change corresponding~~ value related to ~~a change of~~ the IR radiation received from the same optel in at least two frames;

(d) mapping each ~~rate of change~~ value to a color or a shade of gray; and

(e) mapping the color or the shade of gray of each ~~rate of change~~ value to a position in an image corresponding to the position of the corresponding optel in the field-of-view.

2. (original) The method as set forth in claim 1, wherein:
the plurality of frames are acquired over an imaging interval; and
the acquisition occurrence of each frame is fixed or variable.

3. (original) The method as set forth in claim 1, further including the step of adjusting for the absolute temperature of the IR radiation acquired from each optel.

4. (currently amended) The method as set forth in claim 1, wherein in step (c) determining each ~~rate of change~~ value includes determining a first derivative or a second derivative.

5. (original) The method as set forth in claim 1, wherein step (b) includes the step of sequentially acquiring IR radiation from each optel in the field-of-view during the frame sample interval.

6. (original) The method as set forth in claim 1, wherein step (b) includes the step of acquiring IR radiation from all of the optels in the field-of-view at substantially the same time.

7. (original) The method as set forth in claim 2, wherein step (b) includes the steps of:

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exposing the patient to ambient temperature air;

initiating the acquisition of frames;

exposing the patient to a flow of conditioned air at a temperature different than the ambient temperature; and

terminating the acquisition of frames after the imaging interval.

8. (original) The method as set forth in claim 1, further including the step of positioning at least one marker on the patient and in the field-of-view, the at least one marker having an emissivity different than the emissivity of the patient.

9. (original) The method as set forth in claim 1, wherein the at least one marker is positioned on a fixed anatomical location of the patient.

10. (original) The method as set forth in claim 1, further including the steps of:

positioning at least one mirror in the field-of-view adjacent the patient; and

orienting the at least one mirror to reflect IR radiation from a part of the patient that is within the field-of-view but is concealed from the IR imaging camera by another part of the patient.

11. (original) The method as set forth in claim 10, further including the steps of:

positioning a grid between the IR imaging camera and the patient;

conveying thermal energy to the patient through the grid; and

acquiring a frame of IR radiation directly from the patient and from the at least one mirror.

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12. (original) The method as set forth in claim 10, further including the step of constructing a three-dimensional image of the patient from the IR radiation acquired directly from the patient and acquired from the at least one mirror.

13. (original) The method as set forth in claim 1, applied to one or more of the following:

(i) detection of neoplastic disease process in a patient;

(ii) detection of angiogenesis in a patient; and

(iii) identification of treatment sites for pain management therapeutic modalities in a patient.

14. (currently amended) An infrared imaging apparatus comprising:

means for detecting IR radiation from each optical element (optel) of an array of optels forming a field-of-view of the imaging apparatus;

a controller for controlling the means for detecting to selectively acquire a plurality of frames of IR radiation from the array at a like plurality of sample intervals, with each frame corresponding to the IR radiation acquired from all of the optels of the array during one sample interval; and

a workstation for determining plural ~~rates of change~~ values as a function of IR radiation received by the means for detecting from the array, with each ~~rate of change~~ value corresponding to a change of IR radiation acquired from ~~like optels~~ the same optel in at least two frames, wherein the workstation:

maps each ~~rate of change~~ value to a color or a shade of gray; and

maps the color or the shade of gray of each ~~rate of change~~ value to a position in an image corresponding to the position of the corresponding ~~optels~~ optel in the field-of-view.

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15. (original) The infrared imaging apparatus as set forth in claim 14, wherein each optel corresponds to the smallest element in the field-of-view that can be processed by the means for detecting.

16. (currently amended) The infrared imaging apparatus as set forth in claim 14, further including means for converting IR radiation acquired from each optel into corresponding data, wherein the workstation determines the ~~rates of change~~ value for each optel ~~the like optels in at least two frames~~ from the data corresponding to the IR radiation acquired from ~~each~~ the optel ~~of each frame~~ in at least two frames .

17. (original) The infrared imaging apparatus as set forth in claim 14, wherein:

the plurality of frames are acquired over an imaging interval; and

the acquisition occurrence of each frame is fixed or variable.

18. (original) The infrared imaging apparatus as set forth in claim 14, wherein:

the acquisition occurrence of each of the plurality of frames occurs logarithmically over an imaging interval; and

the acquisition occurrence increases late in the imaging interval.

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19. (original) The infrared imaging apparatus as set forth in claim 14, wherein the at least two frames are separated by at least one frame.

20. (original) The infrared imaging apparatus as set forth in claim 14, wherein:

the acquisition of frames is synchronized to heartbeat cycles of a patient received in the field-of-view; and

the at least two frames are acquired during a like portion of two different heartbeat cycles.

21. (original) The infrared imaging apparatus as set forth in claim 14, further including at least one mirror positioned adjacent a patient received in the field-of-view, wherein:

the at least one mirror is received in the field-of-view; and

the at least one mirror is oriented to reflect IR radiation from a part of the patient that is within the field-of-view but is concealed from the means for detecting by another part of the patient.

22. (original) The infrared imaging apparatus as set forth in claim 14, wherein the apparatus is utilized with a patient for one or more of the following:

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(i) detection of neoplastic disease process;

(ii) detection of angiogenesis; and

(iii) identification of treatment sites for pain management therapeutic modalities.

23. (new) The method of claim 1, wherein each value is a rate of change of the IR radiation received from the same optel in at least two frames.

24. (new) The apparatus of claim 14, wherein each value is a rate of change of the IR radiation received from the same optel in at least two frames.

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